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The Growers Solution

SUMMER 2009

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Is Now the Time to Foliar Spray?

By Jim Halbeisen

The fertilizer price run up created by the raw material suppliers has resulted in an economic and probable production mess for North America's 2009 crop season. As fertilizer prices increased, commodity values decreased significantly. The natural reaction had farmers refusing to purchase their fall 2008 fertilizer. And because fertilizer prices stayed relatively high and commodity prices stayed low in the early spring of 2009, they continued to resist any aggressive application of fertilizer elements. Farmers waited until the "last minute" to make spring fertilizer purchases and, to a degree, application rates were reduced. For some producers, these lower early application rates could create later production and quality problems if environmental conditions are not conducive to mineral releases from the soil.

Mineral Supplementation Through Foliar Feeding

If the early 2009 crop growth appears to have been affected by the fertilizer mess and is experiencing mineral deficiencies, producers can move their crops along by foliar feeding.

Using radioactive isotopes in the early 1950's, Michigan State University researchers proved conclusively "plants can take up nutrients through the foliage." Growers customers started foliage feeding Growers Mineral Solutions (GMS) in 1955, and our experience and successes since then demonstrates our ability to help farmers through the fertility problems that could occur in the 2009 crop season.



Jim Halbeisen's view from the tractor seat.

The science behind foliar feeding has been known for years, but only Dr. Victor Tiedjens pursued the use of quality ingredients and the proper balance of nutrient elements to insure its

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Follow Growers Lead in Tough Times

By Jim Halbeisen

After the huge fertilizer price run up in 2008, to a slight degree, prices did come down some in the spring of 2009. But, after the dust settled, how much fertilizer price regression did we actually see relative to

the price of various commodities? Only the 2009 growing season cash flow statements will determine the answer for producers.

Since 1955 Growers Chemical Corporation has consistently maintained agricultural producers use more fertilizer to produce crops than is economically necessary. Plant physiology text books all say 96% of healthy plant tissue is composed of carbon (C), hydrogen (H), and oxygen (O), which is mainly sun, air and water. Growers believes satisfying the other 4% of a plant's make up requires a much more conservative approach to fertilizer application rates and correspondingly fewer costs to agricultural operations. Over the years, in addressing agricultural fertilization's biggest enemies, "Time" and "Distance," Growers people have recommended placing nutrients as close to the plant as possible during its stress periods. This is "Target Fertility" and it allows

producers to use lesser amounts of mineral fertility and achieve much better economical success.

The ability of Growers Mineral Solutions (GMS) to address the "Time and Distance" issue was discussed in detail in the Winter, 2009, edition of *The Growers Solution* in the article "Sought After New Fertilizer Technology is Here".

Many in the agricultural establishment say using smaller amounts of fertility elements is dangerous because farmers will eventually "wear out" their soils as crops remove or deplete soil elements. The experts contend nutrient analyses of soils and plants can determine the necessary levels of elements needed to create the most economic yields, and, they say, fertility arithmetic is simply a matter of matching the volume of the elements in the

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Rejuvenating A Mexican Produce Operation

By Jennie Henry

Spending a real nice warm day with Georgia's Kent Hamilton on his produce operation, Valle Del Sur, in the center of Mexico's Yucatan peninsula, was a welcome treat, especially after we, my parents, Joe and Jeanette Henry, and I, had just flown out of Ohio's February snow and single digit temperatures.

About the first thing Kent told us as he toured us around the farm in Kubota RTVs, "Quality is everything in our business. Shelf life. On this high calcium program with our cucumbers, instead of having soft tissue, they are real crunchy. They are real crisp—that's important to us - and they taste good."

The short story, about five years ago Kent went to Mexico looking for a producer to supply him with vegetables he could market in the United States and Canada during the winter.



The lineup of U.S. visitors to the Valle del Sur farm in the Yucatan. Martin Flora, the farm's production manager, is on the left. Pete Collins, the Growers representative, from Florida is next. Kent Hamilton, owner of Valle del Sur and Southern Valley is in the center. Joe Henry, president of Growers Mineral Solutions with Steve Sumner, a close friend of Kent and an expert melon grower from Georgia, completes the lineup on the right.

He ended up purchasing land, clearing and leveling it for trickle irrigation. He erected a packing house, cooler, office, and employee housing. Transportation was implemented, both for their 750 employees, and to have the product arrive at their Georgia warehouse in four days.

Originally, crops were planted using small amounts of a local MAP, monoammonium phosphate. At first cucumbers were excellent quality, but later, even in that first season, quality decreased and they had a lot of disease pressure.

As he showed us the farm Kent said, "The fertilizer we used in Georgia had been a 4-0-8 which is made from potassium nitrate, calcium nitrate, and magnesium nitrate with a micro nutrient package. We didn't start pumping any of that fertilizer until we had picked the cucumbers for the second time.

"I had told the agronomist/consultant back in

the U.S. the plants looked like they didn't need any fertilizer, but he told me if we didn't put on fertilizer, the plants would crash and they would burn all of the nutrients out in the soil. Then the plants would start to go down, so we needed to start supplementing some fertilizer.

"So we began adding more fertilizer. Our tissue samples always showed high nitrogen and high potassium. We had a lot of problems with production, we had a lot of disease and our quality was not good at all. We would see shriveled ends and sunken spots on the cucumbers before we even loaded the containers here in Mexico. Then we were losing 25 to 30% of our product after we paid to ship it to the US. The agronomist said that it was post harvest handling: it was sitting in the bins too long, we weren't precooling it long enough, it was this, it was that. It never did go back to the quality of the product we were growing at first."

Kent changed agronomists, began asking questions and studying by himself looking for answers. Early in 2008 he was near the end of his rope when Growers Representative, Pete Collins and District Manager Ed Bulcher, came by his Southern Valley Farm in Georgia.

Kent said, "They were telling me about the importance of calcitic limestone and that it was better to foliar feed a plant than to put dry fertilizer in the soil. They gave me a book by Dr. V.A. Tiedjens, *More Food From Soil Science*, which I have now read a couple of times.

Tiedjens said on a high pH soil you never want to use nitrate nitrogen. On a soil with a pH neutral or above you always want to use ammonium nitrogen and he also said that if you use nitrate nitrogen, the plant would develop chlorotic type symptoms due to iron deficiency and it would be very difficult to correct.

"There is considerable experimental evidence to show that nitrate nitrogen is most efficiently used by plants at a low pH of 4 while ammonium nitrogen is most efficiently used if the growing medium has a near neutral pH. Furthermore, if plants are supplied with only nitrate nitrogen at a near neutral pH, chlorosis due to iron deficiency may develop and be difficult to correct."

Quoting Dr. Tiedjens from his book: *More Food From Soil Science*, Page 61



The Valle del Sur sprayers. The drops have nozzles which help to cover both sides of each trellis. This was designed by the farm for this location.

"That was exactly what we were seeing here in Mexico. We had chlorosis type symptoms, the plants were sickly, the leaves were small, and we always had magnesium, zinc and iron deficiencies showing up. We had increased those nutrients in our fertilizer, but it still wasn't fixing the problem. Nobody could ever tell me why our first season on the MAP fertilizer program did so well, and why we hadn't had a crop since. What I had read in Tiedjens' book seemed to be the answer to the problems we were having in Mexico. It wasn't long before I pulled a soil sample and had Mr. Ed Bulcher travel down here with me to look at the farm."

Ed visited Kent's Mexican farm in the spring of 2008 and although the soils are of a calcitic limestone origin and the Growers soil tests showed adequate calcium, Ed's extensive experience told him the plants were lacking available calcium, so he recommended high calcium lime additions.

In the summer of 2008 following Ed's visit to Mexico, Kent and his production manager, Martin Flora, traveled the midwest visiting Growers' customers and looking for a rock crusher to purchase. They found a crusher, had it shipped to Mexico, and are now grinding high calcium lime from the farm's own limestone outcroppings.

Kent explained, "The limestone we applied was mined right here on the farm. We ground it up, spread it ahead of the rainy season and let the rain wash it in. We had been farming on plastic and drip, so we pulled up the plastic but left our drip tape, and just spread the lime on top of our beds. We didn't mix it in the soil. We put 15 tons on and it turned the soil almost white, but after at least 30 inches of rain and because the lime was very soluble, it all went down into the soil. We deep sub soiled in between the beds to open channels so the heavy rains can carry some calcium down deeper into the soil. There is very little water runoff, because the soil absorbs rainfall very well now."

Kent is very pleased with his experience with the Growers Program, "Our cost of fertilizer is about 30 to 40% of what it used to be, maybe even less. Our fungicides to control diseases

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soil to the volume of elements to be removed by the crop.

But then, various research papers from the experts' peers show crop nutrient removal is quite variable and has little relationship to crop yield. One study entitled "Nutrient Removal by Corn Grain Harvest," appearing in *Ag*

Professional, Spring, 2004, stated, "The variability seen in this study raises questions about the usefulness of average values for estimating crop nutrient removal across a range of conditions." The study showed a corn crop removing soil phosphorus (P) from as high as 5.4 grams (g) of P per kilogram (kg) of plant tissue to as low as 2.2 g/kg. This variability is the same for the other necessary major elements, while significantly larger for the necessary minor elements.

Similarly, different soil testing procedures, themselves, show wide variations in mineral levels in soils; so, deciding on which test procedure to follow is difficult. Also, most tests account only for the top 8 inches of the soil profile, thus, if plant roots of a growing crop can probe deeper, the nutrients in the soil below 8 inches should be available and considered.

In summary, Growers Chemical Corporation believes if farmers use proper calcium applications to their soils, nutrients will be made available to growing crops deeper into the soil profile. Additionally, when farmers target their fertility, significantly less mineral elements will be needed to grow economically competitive crops. Producers can choose to follow only one part of the Growers Program, calcium or target fertility, and the need for mineral elements will be reduced accordingly.

Should major suppliers of fertilizer raw materials, such as Potash Corporation of Saskatchewan or Mosaic, continue their refusal to reduce their product pricing so as to match commodity price reductions, producers following the Growers lead, using fewer higher priced mineral inputs, should be able to better survive ever tightening financial conditions. ■

On The Road Again

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This summer and fall Growers Mineral Solutions is scheduled to set up and staff booths at the following upcoming farm shows. It's a great time to stop in and review your plant food and mineral supplement programs, hear about new developments at Growers or just chat with the folks who make it all happen—your friends and neighbors.

July 3-4	Horse Progress Days Odon, IN
July 21-23	Michigan Ag Expo East Lansing, MI
July 21-23	Wisconsin Farm Technology Days Waterloo, WI
Aug. 4-5	Farmfest 2009 Redwood Co., MN
Aug. 11-13	Empire Farm Days Seneca Falls, NY
Aug. 18-20	Penna Ag Progress Days Rock Springs, PA
Aug. 19-20	Hastings Cty Plowing & Farm Show Belleville, ONT
Sept. 1-3	Farm Progress Show Decatur, IL
Sept. 16-17	Central NY Farm Progress Show Mohawk, NY
Sept. 22-24	Ohio Farm Science Review London, OH
Oct. 20-22	Sunbelt Ag Expo Moultrie, GA

Hope To See You!

Foliar Spray

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success. (Ask your GMS Sales Representative for a detailed explanation of the science of foliar nutrition or call Milan, Ohio, at 800-437-4769.) In recent years, the dawn of genetically modified organisms and the expanded use of post emergence weed control has given producers a more positive perspective of foliage feeding, and that has helped foliar nutrition gain more widespread acceptance.

Quality and Balance of Plant Minerals

Through his hydroponic research, Dr. Victor Tiedjens found plant absorption of several minerals sprayed on at the same time to be more effective than if applied singly, especially when properly balanced in relation to each other. The purity of the minerals applied affects plant absorption, because toxicities, such as high salt levels, heavy metal concentrations, even if they do not cause "burning," of plant tissue can cause enough injury to prevent proper absorption and plant functioning.

Keys to Foliage Feeding

With over a half century of foliar feeding experience, Growers Chemical Corporation understands the proper protocols needed to insure its success which are:

1. Good plant coverage: To obtain the best plant coverage for good nutrient absorption when foliar feeding, it is important the spray particles are small, a fairly fine mist is best.

2. Do not foliar spray in the heat of the day: Foliage sprays of GMS are most effective when dew is on the leaves, so sprays should be applied in the early morning, late afternoon (evening), or on foggy or overcast days in summer. During the heat of the day or in bright sunlight, plants will not absorb minerals through the foliage. Spring or fall foliar sprays can be made during a higher percentage of daylight hours. In very early spring and very late fall, there may be times when it would be prudent to wait for warmer temperatures.

3. Water Quality: If water is used for dilution,

its quality has a very large impact on the effectiveness of GMS. The most important factor is the water's dissolved solid load or the water's calcium and magnesium content. Hardness may be a problem because the minerals, calcium, in hard water can form a very strong chemical bond with GMS's phosphorus, which could result in a white precipitate (milky cloudiness) not dissolvable to any extent in water.

If the precipitate occurs, two problems arise. The first is pretty obvious, physical plugging of screens, orifices, and nozzles which can sometimes be avoided by using larger openings to allow the precipitate to flow better.

Larger openings may overcome plugging, but they do not solve the second and more important problem, which is the hard water's calcium 'tying up' some of the GMS's phosphorus. This can compromise GMS's mineral balance and its efficiency feeding the crop. If diluting GMS is necessary, the softer the water the better.

4. Compatibility: Other than uncontaminated water, Growers Chemical Corporation does not recommend mixing any other product with GMS. However, if GMS is to be mixed with other materials, a compatibility test should be conducted. The test should include all of the pertinent products in their proper proportions, and be conducted over a period of several hours to ensure complete mixing has taken place. The compatibility test should result in a clear solution with no obvious precipitates.

5. Multiple sprays: Growers Chemical Corporation suggests producers use multiple foliar sprays to address deficiencies in plant mineral levels, especially on those crops with larger mineral needs. Earlier sprays tend to help improve plant vigor which makes later sprays more beneficial for crop production, and the multiple spray approach helps avoid omissions from one time applications.

Please contact your local GMS Sales Representative or the Growers Chemical Corporation home office at 800-437-4769 with any questions concerning foliar feeding of crops or water quality. ■

Growers MINERAL SOLUTIONS

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Mexican Produce Operation

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have been cut very significantly. It has definitely improved our program. Our quality has improved. Before we had to do a lot of repacking when our product got to Georgia. Now we are doing very little repacking which is a tremendous savings for us. And our yields

Kent said, "What Dr. Tiedjens said in his book explains why we had such good results the first year when we were using ammonical nitrogen and why it was a total failure after we'd gone to the 4-0-8 with all nitrate nitrogen. That's what I like about the Growers Program, it's not complicated...It's a simple program. I like that about it...It's so basic and so simple."

have more than doubled from what we had been doing the past few years.

Realizing he was having trouble with the high sodium in the well water, Kent set up a sulfur burner to make the irrigation water usable. He was also having trouble with aluminum toxicity

symptoms with his plants. The addition of high calcium limestone to the soils helped to smooth both of these issues out.

"We are in the early stages of this Growers Program. It is a very radical program, and it's a lot different than anything we have ever seen. We've always heard you use limestone for a soil amendment to adjust the pH. Dr. Tiedjens says, 'No, you use limestone as a fertilizer.' It is very radical to what we have been taught. What little we know now going into it we can't say that limestone has really helped our crop, but one thing we can say for sure, is that it has not hurt our crop. Actually, we believe that it has helped our crop.

"I figure our cantaloupe crop, now 55 days old, had 17 pounds of nitrogen, 22.4 pounds of phosphorous and 19 pounds of potassium (per acre). The plants have excellent color and absolutely no deficiencies. Those cantaloupes have been sprayed probably 4 to 5 times with 1/2 gallon per acre of Growers Solution, and that's all of the fertility they have had. Before when we were applying a lot of fertilizer, we had all kinds of deficiencies. Those have completely gone away.

"Our yields are great, the diseases are very manageable. Our quality is unbelievable. We have good shelf life on our product with very little dehydration. The fruit seems to have more dry matter and less water in it. What we are seeing now is very impressive. We are very excited with what we see. We are being told the longer the calcium is in the soil, expect to see even better results.

"Cucumbers have been our primary crop, but we are also growing zucchini squash, yellow straight neck squash, spaghetti, acorn and butternut squash. We are experimenting with



Chino Ramirez is the Valle del Sur farm manager. Ed & Rose Bulcher photo

cantaloupes, experimenting with beans. The cantaloupes are just now setting fruit heavily. We were concerned about the beans getting kind of rubbery, not staying good and firm in shipping and maybe getting some kind of rust or something in them. But that hasn't been any issue at all, the quality on the beans has been excellent. They look like they have been just picked when they get into Georgia which is generally 4 days later."

Kent described his operations in the U.S. and Mexico, "In Georgia we farm about 800 acres in the spring and we replant it in the fall. Its all on plastic and drip. We are growing bell peppers, about 8 different kinds of hot peppers, cucumbers, squash, eggplant and cabbage.

"Here in Mexico, we have about 800 acres of land. We start planting about the middle of September and harvest through about the middle of May. It is a very long season, so we have time to get that early crop off and plant another. On the 800 acres of land, we actually grow about 1,200 acres of vegetables, primarily cucumbers, zucchini squash, different squashes and eggplant. We are also looking at beans, okra, and melons."

For the complete photo journal of the Valle del Sur trip, check out the crops section of the growers website, www.growersmineral.com. ■

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